AFHSC

Armed Forces Health Surveillance Center

Fiscal Year 2012/2013 Report

Director's Letter

Friends and Colleagues,

Greetings from the Armed Forces Health Surveillance Center (AFHSC) and thank you for taking the time to look at our 2012-2013 Annual Report.

The past year has presented a variety of difficult challenges for us. Budgetary constraints have required that we "think outside the box" to accomplish our mission. Despite all this, our products and capabilities are sought after more than ever. The National Strategy for Biosurveillance, published in July 2012, depicted the importance of the kind of work we do for the Department of Defense (DoD) and our Nation.

Within the DoD, biosurveillance is being formally evaluated by a gap analysis and several tasks have been assigned to the AFHSC. A memorandum of understanding signed in July 2012 by the Assistant Secretaries of Defense for Health Affairs (ASD (HA)) and for Nuclear, Chemical & Biological Defense Programs (ASD (NCB)) calls for additional collaboration and coordination between the HA and NCB communities and a more robust biosurveillance and health surveillance capability at AFHSC. DoD leaders have seen our assets and mission as uniquely capable of achieving biosurveillance objectives, with the combatant commands as the primary customers.

Truly, the time is ripe like never before for the DoD health surveillance and national security sectors to work more closely and seamlessly together. Our goals are the same: health of people, health of nations and global health security.

This edition of our annual report outlines the AFHSC divisions' continued work in meeting the needs of our DoD customers. The division of Epidemiology and Analysis (E&A) leverages the Defense Medical Surveillance System (DMSS) and the DoD Serum Repository (DoDSR) to analyze the incidence, distribution, impact and trends of illness and injuries among U.S. military service members. The Medical Surveillance Monthly Report (MSMR), AFHSC's flagship publication, produces feature articles that describe the results of E&A surveillance analyses. The Global Emerging Infections Surveillance and Response System (GEIS) continue to support surveillance in nearly 70 countries around the world primarily through the excellent efforts of the DoD overseas laboratories. Lastly, our newest division, Integrated Biosurveillance (IB), has worked to provide DoD with real-time awareness and understanding of potential emerging infectious diseases and other hazards, and has brought the strengths of the AFHSC together in new and robust ways.

By monitoring, analyzing, and describing the health care of our service members and by increasing the visibility of infectious disease threats globally, the AFHSC is here to provide the information products our community and leadership need to keep our men and women in uniform healthy and capable of defending our Nation. Our adopted motto says it all: Health Surveillance, Analysis, and Insight for Action. Let us know how we can assist you.

Very Sincerely,

CAPT Kevin L. Russell,
U.S. Navy Medical Corps,
Director

Vision/Mission

Vision:

To be the central epidemiological resource and a global health surveillance proponent for the U.S. Armed Forces.

Mission:

Provide *timely, relevant, actionable* and *comprehensive* health surveillance information in order to promote, maintain and enhance the health of military and military-associated populations. AFHSC critical functions are:

- Acquire, analyze, interpret and disseminate information, and recommend evidence-based policy.
- Develop, refine and improve standardize surveillance methods.
- Serve as focal point for sharing health surveillance products, expertise and information.
- Coordinate a global program of militarily relevant infectious disease surveillance.

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The Basics of AFHSC


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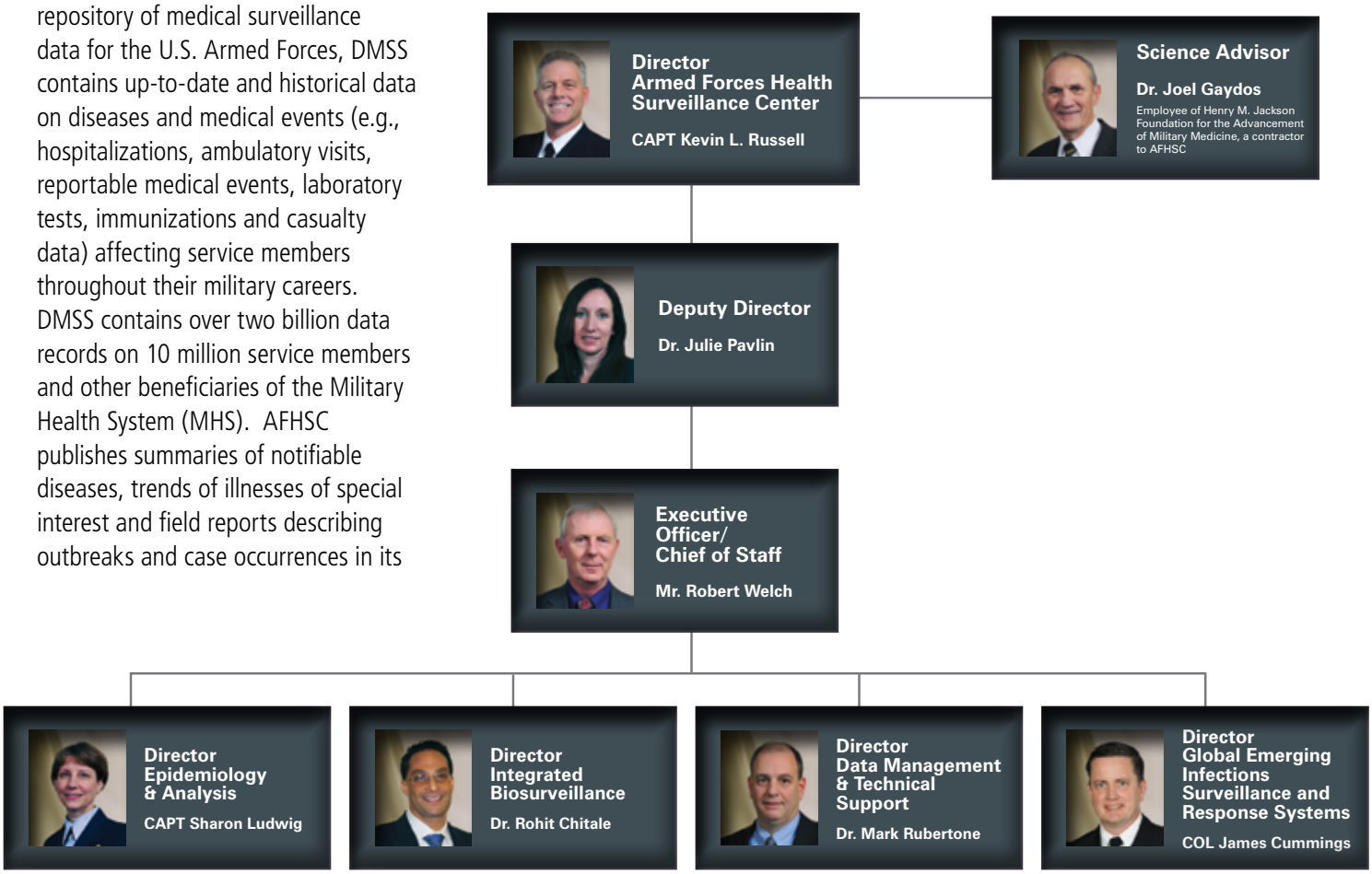
History of AFHSC

The Deputy Secretary of Defense established the Armed Forces Health Surveillance Center (AFHSC) to be the central epidemiological health resource for the U.S. military in February 2008. The Department of Defense (DoD) formed AFHSC by merging the capabilities and resources of the Army Medical Surveillance Activity (AMSA), the DoD Global Emerging Infections Surveillance and Response System (DoD-GEIS) and the Global Health Surveillance Activity of the Force Health Protection Directorate of the Office of the Assistant Secretary of Defense for Health Affairs (OASD (HA)). AFHSC assumed responsibility for AMSA's Defense Medical Surveillance System (DMSS) and the DoD Serum Repository (DoDSR). As the central repository of medical surveillance data for the U.S. Armed Forces, DMSS contains up-to-date and historical data on diseases and medical events (e.g., hospitalizations, ambulatory visits, reportable medical events, laboratory tests, immunizations and casualty data) affecting service members throughout their military careers. DMSS contains over two billion data records on 10 million service members and other beneficiaries of the Military Health System (MHS). AFHSC publishes summaries of notifiable diseases, trends of illnesses of special interest and field reports describing outbreaks and case occurrences in its Medical Surveillance Monthly Report (MSMR), a publicly available peer-reviewed publication for disseminating DoD medical surveillance information.

The DoDSR was developed in 1985 to store blood serum collected during the DoD testing program for HIV infections and later was designated to receive

AFHSC Organizational Structure



serum specimens collected before and after operational deployments. The DoDSR is the world's largest repository of its kind with over 55 million serial serum specimens from over 10 million individuals. The AFHSC also serves a key role in biosurveillance, a rapidly growing scientific field that detects disease in people, plants and animals, to understand the threats from emerging infectious diseases relevant to the military. DoD's mission was expanded through a presidential directive to include support of global surveillance, training, research and response to emerging infectious disease threats. DoD-GEIS was established in 1997, with a central hub at the Walter Reed Army Institute of Research (WRAIR). GEIS coordinates AFHSC's global emerging infectious disease surveillance and response initiatives among a network of partner organizations and executes a militarily relevant surveillance program involving respiratory infections, gastrointestinal infections, febrile and vector-borne infections, sexually transmitted infections and antimicrobial resistant organisms.

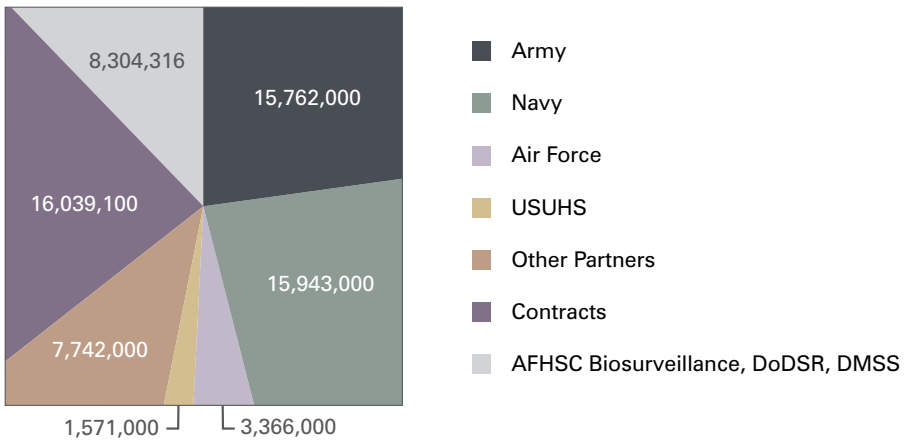
In February 2011, after operating for nearly three years at separate locations, the entire staff of AFHSC moved into renovated offices in Silver Spring, Md., where the DoDSR had been housed for a decade. AFHSC nearly doubled its footprint in this government-leased office to provide workspace for up to 90 staff and increased the freezer capacity of the DoDSR to 100 million samples. AFHSC is organized into four divisions: Data Management and Technical Support (DMTS), Epidemiology and Analysis (E&A), GEIS and the newly created Integrated Biosurveillance (IB).

AFHSC Finances

The AFHSC budget for fiscal year 2013 is $68.7 million prior to sequestration cuts. AFHSC distributed nearly 65 percent of its funds directly to laboratory partners following an extensive internal and external proposal review and a formal briefing and concurrence by the Executive Agency Directorate, Office of the Army Surgeon General, the Force Health Protection Integrating Council (FHPIC) and the Deputy Assistant Secretary of Defense, Force Health Protection and Readiness (DASD/FHP&R).

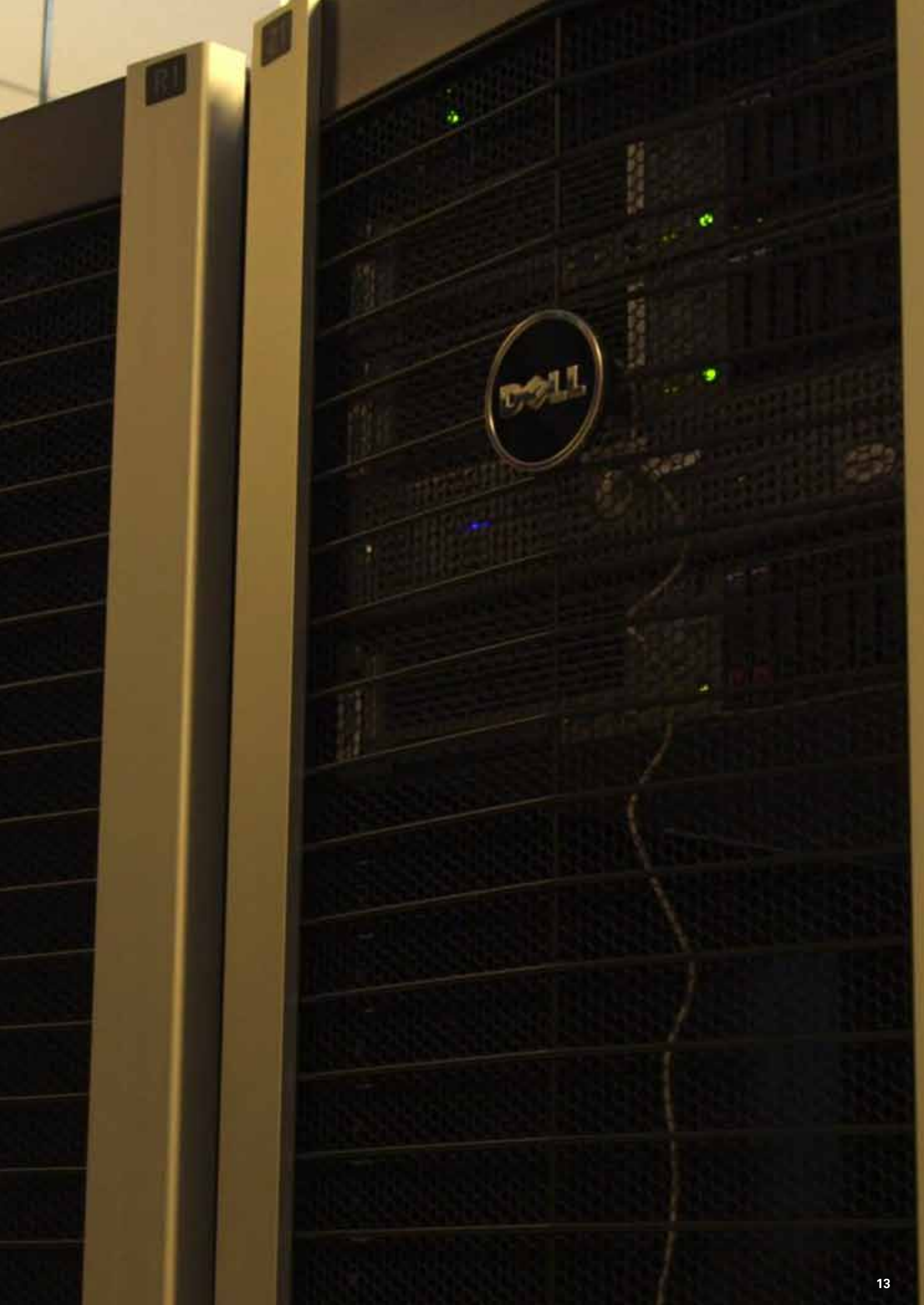
Among funding recipients are the Army and Navy overseas laboratories such as U.S. Army Armed Forces Research Institute of Medical Sciences (AFRIMS), U.S. Army Medical Research Unit-Kenya (USAMRU-K), Naval Medical Research Unit 2 (NAMRU-2), NAMRU-3 and NAMRU-6. Several CONUS-based military and university partners – including the Naval Health Research Center (NHRC), Walter Reed Army Institute of Research (WRAIR), the U.S. Air Force School of Aerospace Medicine (USAFSAM), Uniformed Services University of the Health Sciences (USUHS), The University of Florida Emerging Pathogens Institute and The Johns Hopkins University Applied Physics Laboratory (JHU/APL) – also received funding in support of their robust programs. The remaining funds support AFHSC divisions and headquarters, including biosurveillance initiatives, contracts, MSMR and other infrastructure costs.

FY13 AFHSC Financial Management and Accountability



FY13 Defense Health Program (P-8) funding: One year funding to AFHSC and partners. Total: $68,727,416.

The Elements of Military Health Surveillance

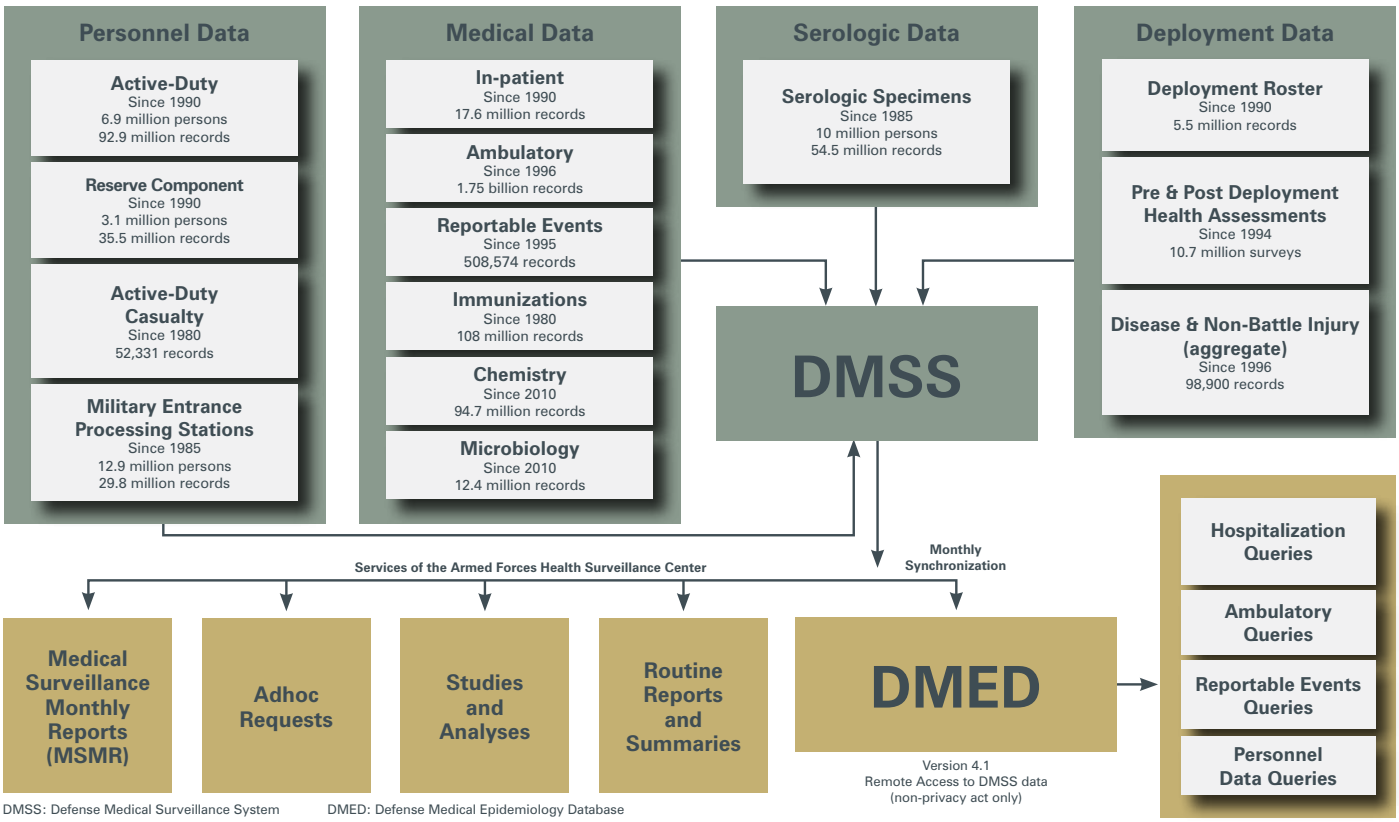


Tools of Surveillance

The DMSS and the DoDSR are longstanding and vital assets to U.S. Armed Forces medical surveillance. The DMSS and DoDSR have its historic roots in routine HIV screening purposes. But their functions were expanded in the early 1990s to encompass all diseases and injuries of military importance, deployment health and the prevention and control of diseases relevant to the protection of U.S. forces. During 2012, the DMTS staff performed significant technical enhancements to the DoDSR that enables AFHSC to continue operating a world-class comprehensive public health surveillance system for the military. The DMSS receives data from multiple sources and integrates it in a continuously expanding longitudinal surveillance database for all individuals who have served since 1990. DMSS records are maintained in person, place and time of reference. The organization of the data facilitates efficient and powerful analyses of morbidity among service members using traditional epidemiologic practices. AFHSC completed significant improvements to the technical and functional capabilities of the DMSS system that went on-line in early 2012. Leveraging the lessons learned over the past 20 years and the advances in information management technology, DMSS is easier to use and more efficient to operate with a small staff of information technology personnel. DMSS operates on a new industry standard processor architecture, operating system and commercial-off-the-shelf applications. Servers were consolidated to increase use and minimize maintenance. Storage resources were separated from processor technology, and the back-end storage resources were consolidated into a single unified and tiered environment. A modern power and cooling environment was installed to utilize industry best practices.

The Defense Medical Epidemiology Database (DMED) is derived from DMSS, providing select data that are de-identified and remotely accessible to individuals outside of AFHSC. The purpose behind DMED is to provide standard epidemiologic methodology used to analyze active-duty personnel and medical event data. Users benefit from unprecedented access to tri-service epidemiological data and can query large amounts of data in a timely and efficient manner.

DMSS Structure and Functional Relationships as of January 2013



DMSS: Defense Medical Surveillance System DMED: Defense Medical Epidemiology Database

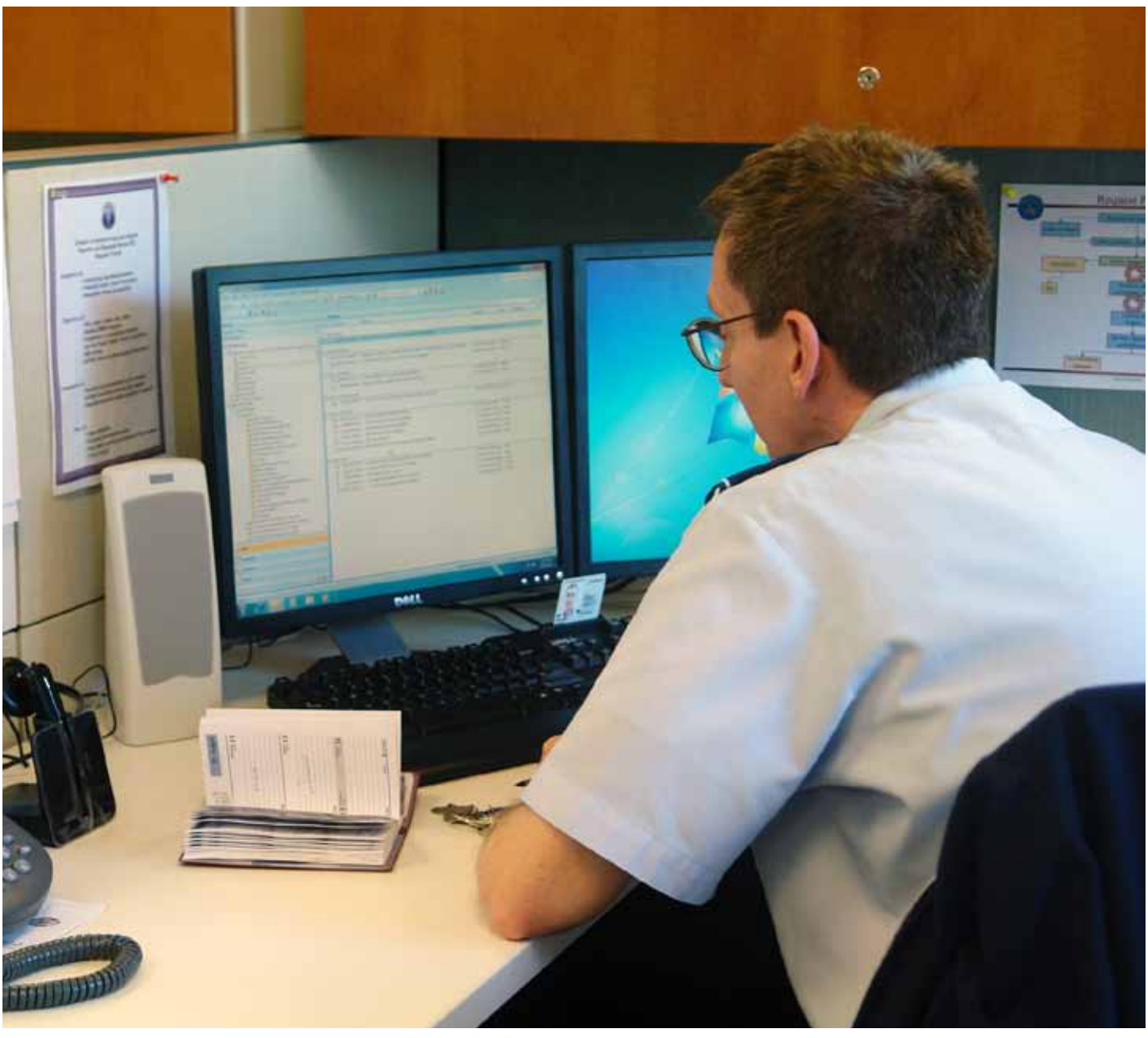
DMED is available to authorized users – including U.S. military medical providers, epidemiologists, medical researchers, safety officers or medical operations/clinical support staff – responsible for surveying health conditions in the U.S. military and conveying this information to commanders for monitoring and enhancing the health of the active duty component. Civilian collaborators in military medical research and operations may also have access to DMED with appropriate documentation. The application for access to DMED is available through the AFHSC website at www.afhsc.mil.

In 2012, DMTS completed the most significant transformation of the DoDSR with its entire inventory relocated to new state-of-the-art freezers. Each freezer operates with advanced cooling equipment and technology. The DoDSR contains over 55 million serial blood derived serum specimens collected from nearly 10 million active-duty and reserve service members throughout their careers. The new freezers have a capacity for over 100 million specimens, positioning AFHSC to support the DoD's serologic surveillance requirements for the next 20 years. The DMSS database and its associated longitudinal surveillance records link to DoDSR specimens. These serial serologic specimens can be linked to relevant demographic, occupational and medical information within the databases at AFHSC to establish a unique and powerful resource to support the conduct of military medical surveillance, clinical care and seroepidemiologic investigations.

Service Liaisons

Each service is represented at the AFHSC by a liaison officer. These officers assist their respective Services' public health authorities and commanders in accessing health surveillance information from DMSS. The liaison officers are responsible for coordinating requests from their respective Services and presenting them at the Review of Requests and Reports (R3) meeting. Requests can also come in through the AFHSC website or other AFHSC subject matter experts and personnel.

At the R3 meetings, AFHSC senior epidemiologists, preventive medicine physicians and key scientific advisors review the methodology and feasibility of each request. Once the R3 approves a request, the title and project log are entered into a privacy protected computer tracking system. Analysts within the Epidemiology and Analysis (E&A) division write the computer code to generate the data analysis and provide results in the form of summary tables or limited de-identified data sets. After careful review, the results are sent to the requestor.



Epidemiological Analyses and Reports

Every year, the E&A division receive and respond to hundreds of health-related inquiries and investigations on the U.S. military. Many of these inquiries are operational in nature originating from key military leaders throughout the DoD with the intent of preserving the health of the U.S. Armed Forces. With expertise of senior epidemiologists, preventive medicine professionals and program analysts, E&A has successfully utilized health surveillance tools at AFHSC – the DMSS and DoDSR – in order to provide timely analyses and reports of actionable health information to DoD policy makers, military commanders, healthcare providers, public health officers and researchers.

E&A prepares analyses that fall into two general categories: Periodic and *Ad hoc* analyses reports.

Routine and periodic reports have assisted DoD policy makers in shaping their preventive measures against diseases or injuries affecting the U.S. military and beneficiaries. For example, E&A provides analyses for AFHSC's "Weekly Influenza Surveillance Report" during the influenza season. This report gives weekly summaries of respiratory illness activity among MHS beneficiaries by geographical regions. Using ICD-9 codes from outpatient

FY12 AFHSC Periodic Reports in One Year

Report Name	Report Name
Meningococcal Report	AFPMB Report of Arthropod Borne Hemorrhagic Fever
DoD Communicable Disease Report	DMDC MedEvacs Report
JTF Communicable Disease Report	AFPMB Report for Mosquito Borne Encephalitis
HA PTSD	Lost Duty Application
Influenza Surveillance Report	AFPM Report for Dengue/Hemorrhagic Fever
DoD Eye Injury Annual	Deployment Health Report
DoD Eye Injury Quarterly	FHP Quality Assurance Measures
DoD Hearing Injury Annual Report	Special: Amputations, DVT, LEISH ARDs
DoD Hearing Injury Quarterly Report	AFPMD Report for Dengue/Hemorrhagic Fever
Malaria YTD Korea	DMISID Table
MHS Dashboard Measures	AFPMB Report for Lieshmaniasis
Malaria Case-Finding Report	AFPMB Report for Lyme Disease
TRADOC Cold Injury Report	USCG Burden of Disease Report
TRADOC Health Injury Report	USCG DHA Report
Reserve Lost Duty	Essence Influenza Like Illness Updates
Injury Installation Reports	Civilian PreDeployment Health Assessment (DD2795) Summary Report
USASOC Special Reportable Events (Semi-Annual)	PreDeployment Health Assessment (DD2795) Summary Report
Theater Medical Data Disease & Injury Report D&I Report	Civilian Deployment Health Compliance Report
Lost Duty Application	Deployment Health Compliance Report
USASOC Special Reportable Events (Semi-Annual)	Army DD2900 Delinquency Report
III, Injured, Wounded Report	Civilian PostDeployment Health Reassessment (DD2900) Summary Report
HA Traumatic Brain Injury	MSMR Deployment Health Assessment Summary
Traumatic Brain Injury Positive Screening	PostDeployment Health Reassessment (DD2900) Summary Report
HA Mental Health Report	PostDeployment Health Assessment (DD2796) Summary Report
Army Annual Injury Report	PostDeployment Health Assessment (DD2796) Summary Report
TRADOC	Vaccine Adverse Events
AFSOC Mental Health and TBI Annual Report	Smallpox Cardiac AE Report
AFSOC Mental Health and TBI Quarterly Report	VAERS Monthly
EUCOM RMES Monthly Summary	Adenovirus Vaccine Monthly Safety Report
USASOC Mental Health and TBI Monthly Report	Adenovirus Vaccine Quarterly Safety Report
USAOC Mental health and TBI Quarterly Report	**Total versions of Reports: 64**
USCG Reportable Events Report	**Total number of Reports: 1,150**
MSMR Sentinel Reportable Events	
Special Surveillance: Motor Vehicle Accidents	

Disease Reports
Injury Reports
Mental Health/PTSD/TBI
Special Reports
Deployment
Vaccine Reports

health encounters, the influenza report uses two categories for health surveillance: Influenza-Like-Illness (ILI), and Pneumonia and Influenza.

The Installation Injury Reports summarize injuries among active duty U.S. service members based on health encounter data captured in the DMSS. The results are presented according to service (except the Coast Guard) and location of occurrence and are available on the AFHSC website at www.afhsc.mil.

The *ad hoc* analyses originate from health-related requests from operational taskers, congressional inquiries, comparative and inferential investigations, global health surveillance, quality control, special studies, and analyses for the MSMR. The *ad hoc* analyses consist of requests for health surveillance on many topics such as mental and behavioral health, traumatic brain injuries, infectious disease, vaccines, and deployment and training-related illnesses and injuries.

E&A provides routine and periodic health-related reports weekly, monthly, quarterly, or annually to the DoD community. These routine and periodic reports investigate trends over time of diseases and injuries such as communicable diseases, training-related injuries, mental health illnesses, traumatic brain injuries and deployment health.

Ad hoc analyses on trends in diseases and injuries that are considered special interest by military leaders may become routine and recurrent reports for weekly, monthly, quarterly, or annually distributions. In 2012, E&A staff completed and distributed over 400 ad hoc analyses and over 750 periodic reports throughout the DoD community.

Multiple publications and DoD reports have cited analyses conducted by E&A. Senior DoD policymakers have requested analyses to assist in their decision making. In 2012, the Institute of Medicine (IOM) published their report on "Substance Use Disorders in the U.S. Military" and cited the MSMR's publications on alcohol-related diagnoses among active duty U.S. service members from 2001-2010 and surveillance snapshot on "recurrent medical encounters associated with alcohol abuse-related diagnostic codes among the active component of the U.S. Armed Forces."

Other health-related analyses conducted by E&A, which were reported widely by the media or requested by the Joint Staff Surgeon, include the evaluation of the impact of deployment length on the development of PTSD and other mental health conditions, health of women after wartime deployment and health care burdens during Operation Iraqi Freedom/Operation Enduring Freedom.

In 2012, E&A and DMTS continued to support health-related investigations that request serum from the DoDSR. E&A currently supports a study which investigates the durability of the HPV4 protection in under-vaccinated U.S. service members. In another on-going study, AFHSC has provided serum specimens to researchers at WRAIR to determine the frequency that U.S. service members may become infected with Hepatitis B and C viruses during deployments. The results of this investigation may have significant policy implications on screening and vaccinations among service members prior to deployment, risk assessment of blood products for transfusions and preventive measures in reducing Hepatitis B and C virus exposure and transmission.

Each analysis and report distributed by E&A entails numerous hours of work and dedication from the staff. Senior epidemiologists, preventive medicine professionals, biostatisticians and program analysts in the division are committed to providing the highest quality of products to the DoD community.

Standard Surveillance Practices

The AFHSC's Surveillance, Methods and Standards (SMS) Working Group documents, develops and publishes standard surveillance case definitions and methodologies unique to AFHSC and the DMSS. These case definitions allow public health practitioners in the DoD to measure disease trends and related biological phenomena in different environments and situations over time and they serve as guidelines for other DoD health surveillance and research organizations and efforts. The AHFSC case definitions are designed for use with administrative health care data derived from the U.S. military electronic health record (EHR) and contained in the DMSS and other available data sets. The definitions primarily use ICD-9-CM codes to identify conditions of interest diagnosed in the military healthcare system. The case definitions are developed by AFHSC staff for MSMR and routine AFHSC surveillance reports and special studies. DoD topic experts are consulted in the development process when needed.

The first set of guidelines was published on the AFHSC website in March 2011. To date, the online guidelines consist of 15 categories with 70 conditions, including noise-induced hearing loss, traumatic brain injuries, low back pain, influenza, malaria and heat and cold weather injuries. The SMS working group, which consists of health care providers and epidemiologists from all the Services, identifies conditions of interest based on topic timeliness, military relevance, potential public scrutiny and importance to military leadership.

The AFHSC also maintains and publishes the Armed Forces Reportable Medical Events Guidelines and Case Definitions. These guidelines are used by the DoD to guide military public health officers, health care providers and laboratories in identifying and reporting specific diseases and conditions that are reported to civilian authorities as well as military-specific reportable diseases and injuries.

The first set of Reportable Medical Events Guidelines and Case Definitions, known then as the Tri-Service Reportable Events Guidelines and Case Definitions, were published in 1998. The guidelines were revised in 2009 and in 2012. The AFHSC develops this document in collaboration with the USAFSAM, the U.S Army Public Health Command, Army Institute of Public Health, the U.S. Navy and Marine Corps Public Health Center (NMCPHC) and the DoD Joint Preventive Medicine Policy Group. More information regarding the guidelines and case definitions can be found on the AFHSC website at www.afhsc.mil.

Armed Forces Reportable Medical Events

5.24 HEPATITIS A

Clinical Description Reference 1

A viral disease with abrupt onset of fever, malaise (i.e. general discomfort or uneasiness), anorexia, nausea and abdominal discomfort, followed within a few days by jaundice and/or elevation of serum aminotransferase levels (AST/ALT). Severity ranges from asymptomatic to severe, generally increasing with patient age.

Laboratory Criteria for Diagnosis

Any of the following:

- IgM antibody to hepatitis A virus (anti-HAV) positive, or
- Fourfold or greater rise in antibody titer in paired sera.

Case Classification

Confirmed:

- A clinically compatible case that is laboratory-confirmed;
- A clinically compatible case that occurs in a person who has an epidemiologic link to a person who has laboratory-confirmed hepatitis A (i.e., household or sexual contact with an infected person during the 15-50 days before the onset of symptoms).

Required Comments

Include the patient's hepatitis A immunization history.

Additional Considerations

Document whether patient is food handler, a day care provider, or is an employee at a long term care facility. Also document relevant travel/deployment history (Note: the incubation period of hepatitis A is usually 28-30 days, with a range of 15-50 days).

AFHSC Surveillance Case Definition

HEPATITIS A
Case Definition and Incidence Rules

For surveillance purposes, a case of hepatitis A is defined as:

- *One inpatient medical encounter* with any of the defining diagnoses of hepatitis A (see ICD9 code list below) in *any* diagnostic position; or
- *Two outpatient medical encounters*, occurring *within 14 days* of each other, with any of the defining diagnoses of hepatitis A (see ICD9 code list below) in *any* diagnostic position; or
- One record of a reportable medical event of a confirmed case of hepatitis A.

Incidence rules:

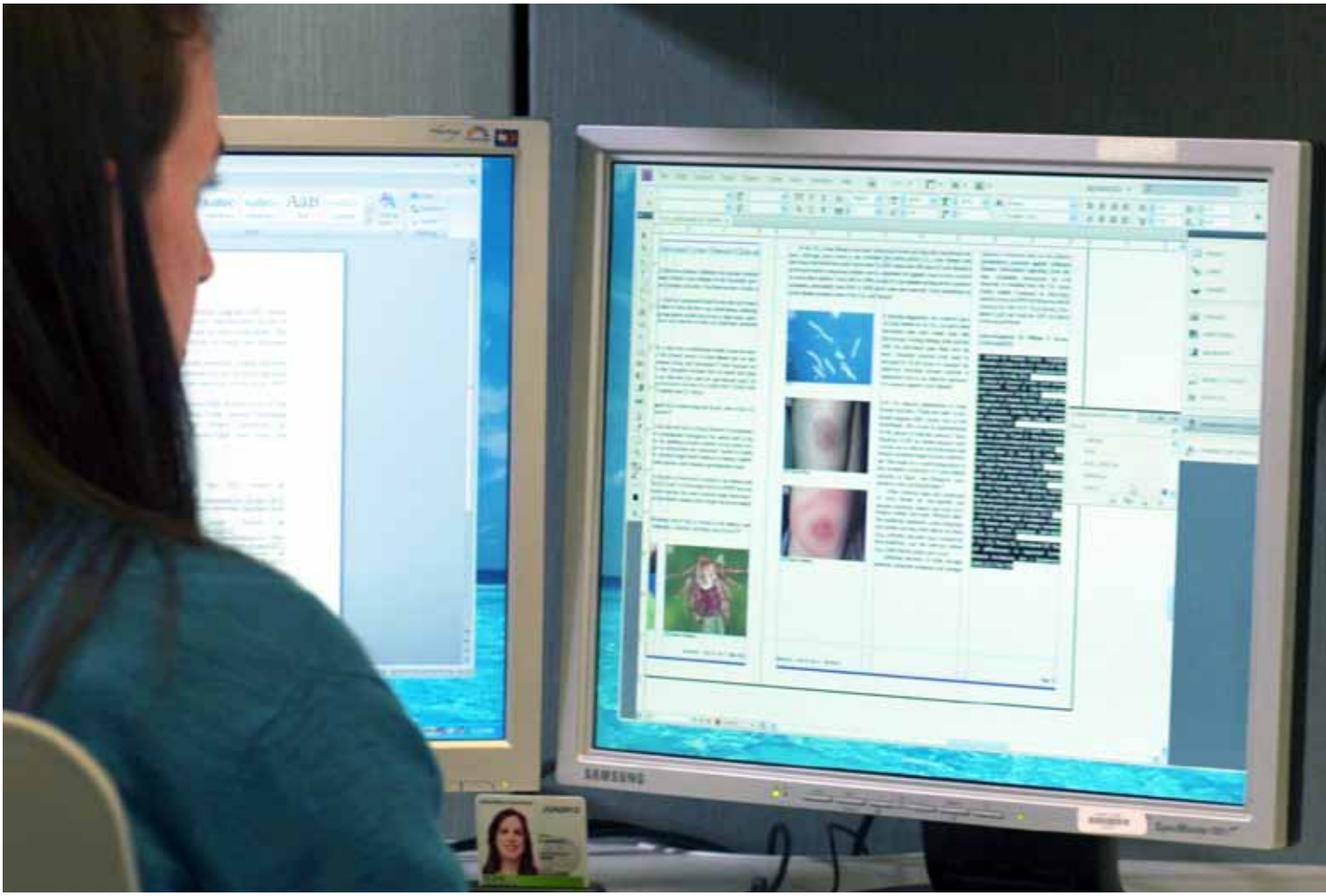
For individuals who meet the case definition:

- The incidence date is considered the date of the first reportable medical event report, inpatient encounter or outpatient medical encounter that includes a defining diagnosis of hepatitis A
- An individual is considered an incident case only *once per lifetime*.

Exclusions:

- Medical encounters with evidence of hepatitis A immunization within one week before or after the case-defining encounter. The following vaccine administered (CVX) codes are used to identify instances of hepatitis A immunization: 031, 052, 083, 084, 085, 104.
- Cases in which the affected individual had a hepatitis A medical encounter prior to the surveillance period.

Medical Surveillance Monthly Report (MSMR)



Launched in 1995, the MSMR is the flagship publication for AFHSC. Its articles provide evidence-based estimates of the incidence, distribution, impact and trends of illness and injuries among U.S. military service members and associated populations. The MSMR's target audience includes health care providers and public health professionals throughout the MHS including clinicians, researchers, academicians, health care planners and policymakers and analysts. The publication has more than 1,000 subscribers for its print edition and more than 500 email subscribers. The MSMR is indexed in MEDLINE and received 3,234 online hits by PubMed users during March-September 2012. Articles published in the MSMR have generated media coverage in diverse publications, including Time Magazine, *The Wall Street Journal, USA Today,* the Huffington Post, *the Washington Post, San Antonio Express-News, Sacramento Mercury News, Stars and Stripes* and Military Times newspapers.

In fiscal year 2012, the MSMR published 46 original articles, eight updates of previously published data analyses, four brief reports and seven surveillance snapshots. Twenty percent of the articles were submitted by authors not affiliated with the MSMR editorial staff. The MSMR welcomes and accepts submitted manuscripts for relevant articles on topics in military public health, epidemiology, surveillance and disease and injury prevention. The most frequent subjects of the original articles and updates in 2012 were infectious diseases, injuries, mental health disorders, health issues unique to women and causes of death among service members. All 172 issues of the MSMR can be viewed on the AFHSC website at www.afhsc.mil.

Residency Training

As a key DoD source for health surveillance and epidemiologic training, AFHSC hosts preventive medicine residents from WRAIR and USUHS for a four- to six-week practicum rotation under the supervision and mentorship of senior staff. Residents enhance their understanding of the complexities of health surveillance systems, their knowledge and application of epidemiology and their critical analytical skills. They also are exposed to the daily operations and initiatives of AFHSC. Central to their practicum, residents design and execute a data analysis project using the DMSS. Residents begin with a hypothesis, test it through designing an epidemiologic study, analyzing and interpreting data and generating a written final report and oral presentation. Since 2008, AFHSC has trained 46 residents from the three Services (Army with 23, Navy with 12 and Air Force with 11). Resident projects have examined such topics as trends and rates of erectile dysfunction among active component male personnel, illicit substance use disorders and non-melanoma skin cancer. Approximately half of the completed resident projects are published in the MSMR or other peer-reviewed journals. During the academic year 2012-2013, three of four resident abstracts submitted to the American College of Preventive Medicine Conference were accepted – two for oral presentation and one for a poster presentation. One resident was a finalist for the Bailey K. Ashford Award as well as a winner of the Walter Reed National Military Medical Center Research Symposium poster competition.

A significant and unprecedented accomplishment by one resident was publication of his AFHSC project entitled, "Prevalence of and risk factors for autopsy-determined atherosclerosis among United States service members, 2001-2011" in the prestigious scientific journal JAMA (Journal of the American Medical Association). Findings from this study suggest that the prevalence of atherosclerosis has declined among deployed U.S. service members since the Korean and Vietnam Wars.

The work of residents has proven valuable to DoD and government policymakers. Information from one resident project on poisoning-related hospitalizations and risk factors for self-inflicted poisoning in the active component, published in the MSMR (November 2011), was used in a presentation by the Army's Vice Chief of Staff during a U.S. Congressional meeting on treatment for overdose and similar issues.

Another study, co-authored by a resident, examined the rate of mental health (MH) outcomes among remotely piloted aircraft (RPA) pilots in the U.S. Air Force (USAF) as compared to USAF manned aircraft (MA) pilots deployed to Iraq/Afghanistan. After adjusting for the effects of several factors that differed between the RPA and MA pilots, incidence rates among the cohorts did not significantly differ. The authors concluded that military policymakers and clinicians should recognize that RPA and MA pilots have similar MH risk profiles. The study, published in the May 2013 issue of MSMR, drew attention from *The New York Times*, Harper's Magazine, United Kingdom Parliament, and the German ARD television station.


Acupuncture Utilization in the U.S.
Armed Forces &
Treatment
for Low Back
n R. Bernhard, MD
MC(FS), USN
ntive Medicine, US
2013

Global Surveillance Network

GEIS Partner Network

GEIS Network and Major Laboratory Partners

- U.S. Army Armed Forces Research Institute of Medical Sciences (AFRIMS) – Thailand
- Naval Medical Research Unit 2 (NAMRU-2) – Hawaii
- NAMRU-3 – Egypt
- NAMRU-6 – Peru
- 65th Medical Brigade – Korea
- U.S. Army Medical Research Unit (USAMRU) – Kenya
- USAMRU – G – Republic of Georgia
- Landstuhl Regional Medical Center – Germany
- Naval Health Research Center (NHRC) – California
- U.S. Air Force School of Aerospace Medicine (USAFSAM) – Ohio
- Navy and Marine Corps Public Health Center (NMCPHC) – Virginia
- U.S. Army Public Health Command (USAPHC) – Maryland
- Walter Reed Army Institute of Research (WRAIR) – Maryland
- Naval Medical Research Center (NMRC) – Maryland

Maintaining the GEIS Response System

The division of GEIS continues to develop, implement, support and evaluate an integrated global emerging infections surveillance and response system. Force health protection of U.S. service members and those of their allies remains the strategic focus of its initiatives. GEIS recognizes that adequate global public health provides for country-level and regional stability critical to U.S. national security interests.

The GEIS network and its partners support a wide range of global surveillance efforts across all emerging infectious disease (EID) surveillance through a holistic approach that includes: surveillance and response; training and capacity building; research innovation and integration; and assessment and communication of the value added. The division receives strategic guidance on its surveillance efforts from various U.S. government agencies, OASD (HA), DASD/FHP&R, U.S. Combatant Commands (CCMDs) and the FHPIC. Key documents guiding surveillance include the International Health Regulations (IHR (2005)), the Presidential Decision Directive NSTC-7 (PPD-NSTC-7), Presidential Policy Directive-2 (PPD-2), Homeland Security Presidential Directive-21 (HSPD-21) and National Strategy on Biosurveillance.

In 2012, GEIS network surveillance and capacity building efforts reached 70 countries. AFHSC effectively communicates information from its surveillance activities to support increased public awareness and understanding of important global issues and shaping of public health decisions. Surveillance findings are routinely shared with the respective Ministries of Health (MoH) and defense departments of the host partner countries. GEIS encourages its partners to present and publish their findings in medical journals and at scientific meetings.

GEIS network engagements are organized around five syndromically-defined EID "pillars": antimicrobial resistance, gastrointestinal infections, febrile and vector-borne infections, respiratory infections and sexually transmitted infections. The key GEIS network partners are the six DoD overseas research laboratories, which each operate a regional disease surveillance network and the four U.S.-based DoD reference laboratories (NMRC, NHRC, USAFSAM, and WRAIR). These 10 DoD laboratories conduct endemic and global emerging disease surveillance and response missions through regional partnerships with local ministries of

agriculture, defense and health, as well as public and private universities and various non-governmental organizations. Among the military organizations that use GEIS disease surveillance information are OASD (HA), DASD/FHP&R FHPIC, the Defense Health Board, CCMDs, Service public health assets, and interagency collaborators that include the U.S. National Security staff, the U.S. Department of Health and Human Services (HHS) and the World Health Organization (WHO).

In 2013, GEIS distributed $49.2 million to support two different kinds of surveillance activities - ongoing sustainment initiatives and novel proposals. Approximately two-thirds of GEIS sustainment funding supports ongoing initiatives to maintain a robust global EID surveillance portfolio that is standardized across all regions. The remaining one-third of funding is awarded to projects submitted in response to an annual request for proposals that address novel EIDs or surveillance efforts affecting the DoD and global health communities. Proposals for both types of support undergo rigorous evaluation by internal and external review committees each year.

Surveillance Activities

GEIS surveillance activities enable the partner network to provide military decision-makers with relevant information that informs disease prevention and treatment policies. The following are key 2012 accomplishments for surveillance activities within each of the GEIS pillars:

Status of implementation of SAGES systems around the world (March 2013).

Antimicrobial Resistance

Since 2006, GEIS and JHU/APL have worked closely with civilian and military health partners around the world to develop and implement a hardware/software system to electronically capture, collect and analyze health surveillance data at national and sub-national levels. The Suite for Automated Global Electronic bioSurveillance (SAGES) includes a number of highly customizable free software components to create electronic forms on mobile phones, collect and aggregate data transmitted by text message, input data through a secure web-page, pull data from other data sources, create charts and graphs, output data to other programs and run statistical outbreak detection algorithms on available data. The system can operate effectively on as little as a laptop computer with a few mobile phones to collect data; or it can be installed on a networked server and store millions of records collected through multiple methods.

The first systems in the Philippines (civilian) and Peru (military) are now fully integrated into their respective health surveillance systems and similar systems in Cameroon, Cambodia, Kenya and Thailand with Ministries of Defense are still undergoing expansion to cover the entire population during 2013. Also this year, new systems developed for the Ugandan military and the Peruvian Ministry of Health will be implemented. Each system is completely separate and conforms to the unique operational requirements and surveillance gaps that are identified during the planning stages with the national authorities. Ongoing development of SAGES will allow public health authorities anywhere in the world to download install and configure fully independent systems without direct U.S. government assistance or intervention and without a licensing fee.

Through the GEIS Antimicrobial Resistant Organism (ARO) program, network partners conduct global surveillance for resistant pathogens to identify emerging public health threats, assist policy-makers in developing therapy recommendations and support researchers with development of new vaccines, therapeutics and diagnostics.

GEIS network partners are exploring pathogens known to cause hospital-acquired and wound infections – such as methicillin-resistant *Staphylococcus aureus* (MRSA) and *Klebsiella* spp. In many regions of the world, limited data exists on the frequency and nature of drug-resistance within the local communities which may lead to inappropriate care and case management. By enhancing hospital-acquired infections (HAI) surveillance capabilities, the U.S. military gains valuable information on local resistant pathogens its personnel may be exposed to during military exercises

and deployments in the region. The host country ministries of health also gain information to help shape infection control programs that treat patients more effectively.

GEIS funded the Multidrug-Resistant Organism Repository and Surveillance Network (MRSN) in conducting ARO surveillance throughout the MHS by supporting a program to screen for genes conferring resistance and additional studies of resistance mechanisms. MRSN detected a bacterium containing the New Delhi metallo-β-lactamase gene bla_{NDM-1} – which renders bacteria resistant to nearly every available antibiotic – in a surveillance swab from an Army soldier injured in Afghanistan in June 2012. This discovery was the first within the U.S. portion of the MHS and led to an important alert for a potentially new challenge to infection control and therapy. In September, MRSN also developed and implemented a cost-effective assay that is capable of quickly detecting all known variants of the Klebsiella pneumonia carbapenemase gene and now allows routine testing of all isolates with suspected carbapenemase resistance. Screening through the assay improves DoD knowledge of resistant pathogens transmission and informs development of infection control policies within individual military treatment facilities.

NAMRU-6 and multiple Peruvian civilian and military hospitals established the country's first-ever surveillance for HAI. Similarly, in Jordan, NAMRU-3 continues work with epidemiologists and infection control teams at three civilian hospitals to conduct HAI surveillance. The purpose of setting up these surveillance activities is to understand the amount of bacterial resistance being observed in different regions where data currently does not exist, and more important locally, to help hospitals evaluate and improve their current infection control policies to contain and reduce the number of infections.

Febrile and Vector-Borne Infections

During 2012, GEIS funded several surveillance initiatives to improve recognition of the risks and threats from febrile and vector-borne infections (FVBI) to U.S. force health protection and the public health needs of partner nations. While traditional vector-borne infections such as malaria continue to cause substantial contemporary morbidity and mortality, GEIS and its global partners are identifying other newly emerging and re-emerging infectious causes of acute febrile illness that require further characterization to better inform health risks. FVBI surveillance activities seek to integrate human, vector, animal and ecologic data to increase awareness of disease risks and threats – primarily through development of mapping and modeling tools which can aid the risk of disease transmission in relevant geographic areas.

GEIS and its network of laboratory partners continually strive to support and complement the needs and capabilities of hosting nations and associated regions. NAMRU-2 researchers and the Vietnamese military are collaborating in the first military-to-military medical diplomacy engagement of its kind. They are focusing on three distinct surveillance areas: malaria drug resistance, entomological studies for malaria vectors and sentinel febrile illness. The results of these maturing collaborations could contribute potentially translatable data to support multilateral force health protection from malaria and febrile illnesses. In collaboration with Bhutanese public health officials, AFRIMS researchers provided critical diagnostic support during an outbreak of infectious illnesses in Bhutan that was quickly confirmed as Chikungunya virus. Believed to be the first laboratory-confirmed cases of Chikungunya virus infection in Bhutan, the findings elevated suspicion for the disease among the country's clinicians and helped guide epidemiologic efforts to detect and control infections.

GEIS continued active surveillance efforts supporting partner nations in West Africa during 2012. Personnel from USAMRIID provided training and testing supplies to enhance diagnostic capabilities for Lassa Fever and other acute febrile illnesses (AFI). In Sierra Leone, fewer than 40 percent of suspected Lassa Fever cases have laboratory confirmation and the majority of AFI remain undiagnosed among patients. The USAMRIID diagnostic data improves individual patient management through disease-relevant therapies and contributes to local and regional public health awareness of circulating endemic diseases.

VectorMap screenshot (www.vectormap.org)

In Liberia, NAMRU-3 researchers conduct ongoing, large-scale mosquito collections aimed at similarly characterizing pathogen prevalence among malaria and arboviral vectors. During vector collections, data is entered into a global positioning system to determine precise locations and then collated within VectorMap that uses an intuitive geographical tool to display vector location and disease transmission risks. The web-based VectorMap program is readily accessible to deployed entomology and preventive medicine personnel to support ongoing operational risk assessments for vector-borne infections.

Gastrointestinal Infections

Through its gastrointestinal infections program, GEIS aims to provide actionable information and threat assessments to DoD personnel and related populations from enterics by improving laboratory surveillance capabilities and determining the prevalence and risk factors of common enteric pathogens. In 2012, GEIS and its global partners pushed to improve integration of enteric activities across the network so that their efforts focused on contributing to force health protection as well as global public health.

NAMRU-6 supported diarrheal and respiratory diagnostics during Operation New Horizons 2012 in the southern coastal Peruvian city of Ica. The investigative team identified and investigated a gastroenteritis outbreak while conducting baseline surveillance

during the operation. After discovering an increased reporting of diarrheal cases (later calculated as an approximate 25 percent attack rate), the investigators held informational briefings to reinforce the need to maintain personal hygiene measures among deployed U.S. military personnel. The NAMRU-6 interventions helped to quickly control the outbreak – although no single etiologic agent or behavioral risk-factor (e.g. specific food, meal, or activity) was associated with the rise in cases. Ongoing investigations from the baseline surveillance data available before and after the outbreak may provide further information on the epidemiology of diarrheal illness in deployed settings.

Similar baseline enteric surveillance activities are also conducted within U.S. military training centers by the NHRC. Over the last two years, NHRC has established enteric surveillance (focusing primarily on norovirus) targeting recruits, operational forces and referral populations at four sites – two Marine Corps, one Navy and one Army. The surveillance activities are important for determining the prevalence, incidence and estimated burden of acute gastroenteritis (AGE) among operational forces. The longitudinal aspect of this study may also provide key data on the temporal changes to specific norovirus genotypes, which could inform future clinical or vaccine trials for norovirus and other enteric pathogens.

The GEIS partner network also conducts investigations of direct benefit to the host country. USAMRU-K conducts enteric surveillance among civilian sites across Kenya, monitoring susceptibility of prevalent bacterial pathogens to commonly prescribed antimicrobials. Researchers found that 58 percent of *Shigella* spp., the most prevalent bacterial pathogen isolated from enteric surveillance in Kenya, are resistant to the antibiotics tetracycline, trimethoprim/sulfamethoxazole and ampicillin. All *Shigella* spp. isolates are susceptible to ciprofloxacin. These data are vital to consider when providing treatment guidelines.

The DoD labs also provide host countries with diagnostic assistance. In 2012, NAMRU-2 enhanced its capability to assist in outbreak identification of food-borne illness in Cambodia. The lab brought in pulsed-field gel electrophoresis capacity and participated in the Centers for Disease Control and Protection's (CDC) PulseNet Asia-Pacific server. The lab now uses an automated platform that facilitates generations of antibiograms for conducting antimicrobial susceptibility testing. This information is shared with the Cambodian Ministry of Health.

Respiratory Infections

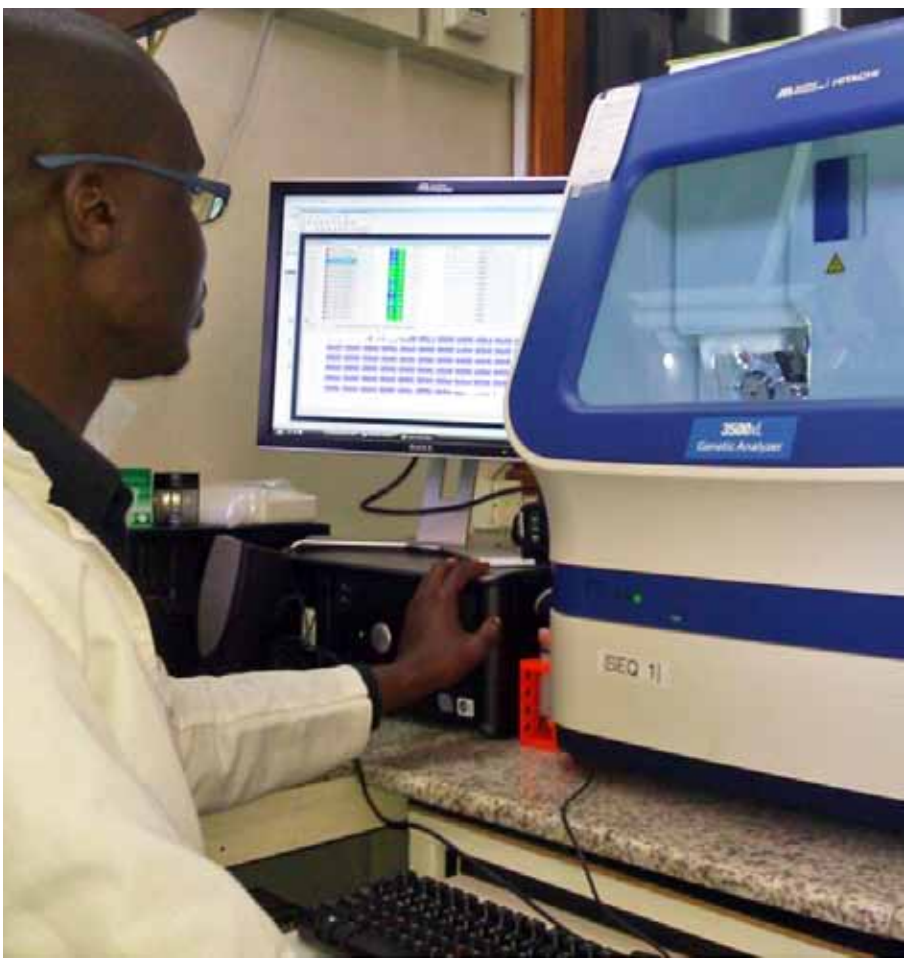
The respiratory pathogen surveillance program monitors respiratory diseases that contribute to force health protection and global public health. The program identifies changes in circulating influenza virus subtypes and genotype strains which impact disease severity, transmissibility and treatment and prevention effectiveness across time and geography. The program also identifies zoonotic transmission and risk factors for influenza infections within the human-animal interface, particularly among high-risk groups in influenza-prevalent settings.

Through continuous support from NAMRU-3 staff, the Jordan Influenza Lab was officially recognized as a National Influenza Center (NIC) in 2012. The NIC lab is now the key point of contact between WHO and Jordan. The lab staff in Jordan currently collect, identify and send representative

Influenza surveillance in domestic swine in Cameroon.

isolates to WHO influenza collaborating centers and regularly reports influenza activity in Jordan to the WHO FluNet. NAMRU-3 also assisted with expansion and enhancement of the Eastern Mediterranean Acute Respiratory Infection Surveillance Network and regional ILI and Severe Acute Respiratory illness surveillance program throughout the region. This program provides a timely regional summary of circulating respiratory disease activity from work at 30 hospitals in eight countries in the Middle East/Southwest Asia region and four countries in East Africa. To further increase timely reporting and regional awareness, GEIS introduced the web-based Respiratory Disease Dashboard in 2012. Nine GEIS partners are currently reporting near real-time surveillance findings from sites in Africa, Asia, Europe and U.S. "shipboard" populations in the Pacific. This electronic reporting will enhance timely analysis of regional and international respiratory trends and the potential identification of new viral subtypes or novel pathogens.

GEIS partners continued their surveillance efforts at the human-animal interface, including genetic characterization, due to the threat of avian and swine influenza. USAMRU-K performed genomic sequencing of influenza viruses arising from a swine influenza outbreak in Cameroon. Researchers collected surveillance samples from a swine market in Yaounde to detect zoonotic influenza within swine and poultry populations and agricultural workers. The sampled swine were raised at various facilities prior to their arrival at the market. The animals were transported to the market by rail or truck and kept in pens with animals of mixed origins until sold. Of the 30 full genomes, 29 were identified as the 2009 A/H1N1 strain. The remaining strain was identified as a re-assortment influenza strain containing both 2009 A/H1N1 and seasonal A/H3N2 genes suggesting that human-to-animal influenza transmission is occurring. While the 2009 pandemic is known to have been caused by a virus derived from swine, the results would seem to show that humans have reciprocated by transmitting the disease back to swine.



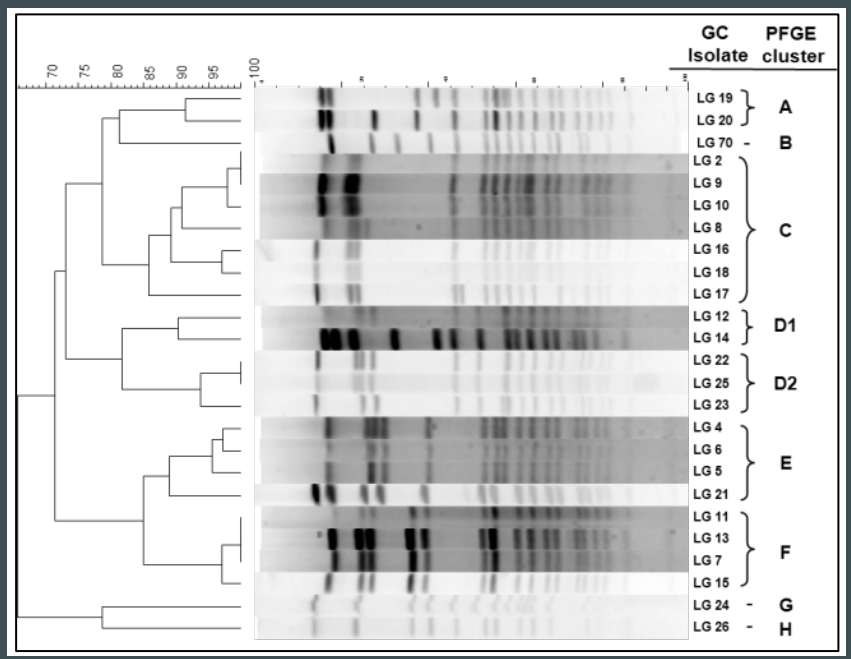
USAMRU-K personnel performing genetic sequencing and analysis of influenza viruses.

Sexually-Transmitted Infections

GEIS continues to support capacity building to enhance military-relevant sexually-transmitted infection (STI) surveillance efforts which adequately address treatment and prevention strategies. One area of focus is continued surveillance for antibiotic-resistant *Neisseria gonorrhoeae* (GC). Coordination of domestic and foreign GC surveillance among service members and high-risk groups in regions of deployment is being

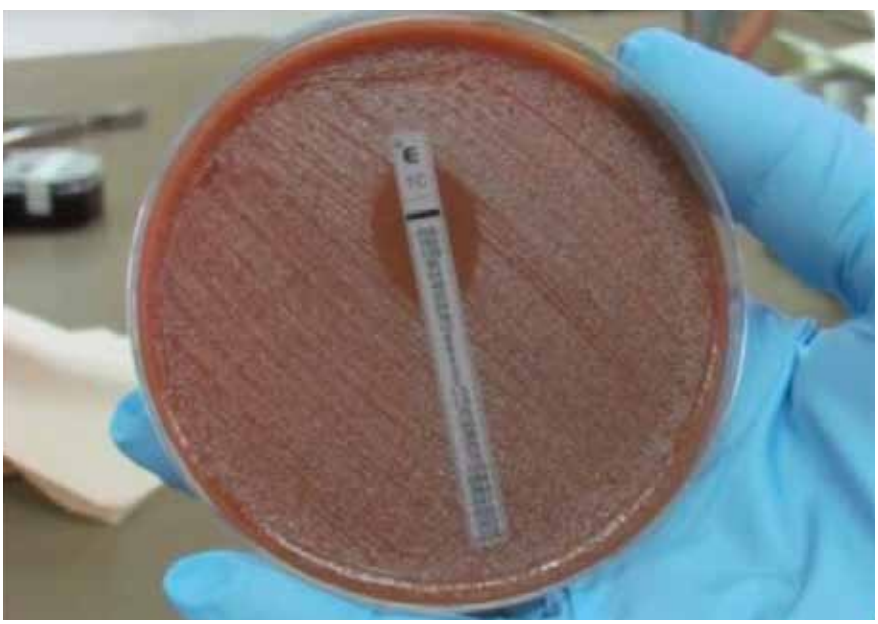
effected in seven countries through a STI lab network of partners which will result in a better understanding of STI transmission networks and allow investigation of the propagation of antimicrobial resistance patterns – which is complementary to ongoing efforts by the CDC and WHO.

In the U.S., GEIS supported the Infectious Disease Clinical Research Program (IDCRP) in establishing and expanding a network of military STI surveillance and clinical research sites. The network now comprises four major military treatment facilities at Fort Bragg, N.C., Fort Sam Houston, Tex., Fort Carson, Colo. and Fort Lewis, Wash. and will be expanded to two additional U.S. Navy sites in 2013 (Portsmouth, Va. and San Diego, Calif.). IDCRP scientists continue to build collaborations with overseas laboratory partners in Latin America, Africa and Southeast Asia to support DoD capacity building efforts in GC resistance surveillance which improves understanding of GC-related disease epidemiology and its impact on the military worldwide.



Conventional PCR-Pulse Field Gel Electrophoresis (PFGE) Analysis of GC Isolates.

In support of this network, collaborating scientists at the USUHS have developed a DoD-specific reference laboratory and GC repository which provides complementary diagnostic capacity to the surveillance efforts. This laboratory capacity will allow the DoD to more efficiently serve as a central antibiotic sensitivity testing (AST) reference laboratory in coordination with U.S. Navy and Army scientists, the University of Washington's GC reference laboratory and the CDC's Gonococcal Isolate Surveillance Project. GC strains will be cultured and tested for sensitivities at the DoD laboratory and typed by molecular methods. In addition, GC strains from the repository will also be made available to DoD researchers and network partners to support future GC-based research in the development of diagnostics, strain genotyping and AST assays.



Disk Diffusion tests for determination of antibiotic resistance in GC

GEIS Outbreak Response Promoting Capacity Building

A central objective of the GEIS surveillance and capacity building efforts is rapid detection of emerging infectious threats for timely outbreak response by U.S. military and host country health systems. In 2012, GEIS network partners assisted in a total of 48 outbreak response efforts.

NAMRU-2 played a critical role during a febrile, cluster outbreak of 69 individuals in Cambodian province of Kampong Speu in March. Leveraging its existing relationship with the provincial health department, Cambodian officials sent serum samples from the Trapeang Roka village in the Kong Pisey district to NAMRU-2's main laboratory where PCR analysis identified Chikungunya virus. The results were the first positive confirmation by an in-country lab for the outbreak, which were promptly reported back to the Kampong Speu Provincial Rapid Response Team.

Representatives from NAMRU-2 then received an invitation to participate in a meeting with the Directors of Cambodian Department of Communicable Diseases Control and the National Malaria Center. Other institutions represented included the Cambodian Under-Secretary of Health, National Institute of Public Health,

AFHSC-GEIS Outbreak Investigations Supported, FY 2012

Country	Laboratory	Disease	No.
Cambodia	NAMRU-2	Chikungunya, Dengue, EV71	1 1 1
Jordan	NAMRU-3	Respiratory Infection	1
Yemen	NAMRU-3	Dengue, Chickungunya	1 1
Djibouti	NAMRU-3	Dengue	1
Togo	NAMRU-3	Yellow Fever	1
Qatar	NAMRU-3	Infectious gastroenteritis	1
Peru	NAMRU-6	Tuberculosis, Upper respiratory infection, Acute enteritis, Viral encephalitis (Oropuche fever), MDR TB, Convulsive cough, Group A beta hemolytic streptococcus Meningitis, Leptospirosis, Influenza B	1 1 4 1 1 1 1 1 1 1
USA	NHRC	Acute Gastroenteritis, Respiratory Illness, Group A Strep, Mycoplasma pneumonia, Influenza	9 2 2 1 1
New Zealand/ Antarctica	USAFSAM	Influenza	1
Japan	USAFSAM	Influenza	1
Qatar	USAFSAM	Norovirus	1
Kyrgyzstan	USAFSAM	Influenza	1
Kenya	USAMRU-K	Ebola, Dengue	1 1
Uganda	USAMRU-K	Ebola	1
Cambodia	AFRIMS	Influenza	1
Bhutan	AFRIMS	Chikungunya	1
Nepal	AFRIMS	Fever Outbreak	1
Total		**Respiratory = 17** **FVBI = 14** **Enterics = 17**	**48**

GEIS Funded Training Initiatives, By Geographic Area, FY2012

Combatant Command (CCMD) (A/C/E/N/P/S)	No. Training Initiatives	No. Countries	No. Trainees*
United States Africa Command	43	11	1000
United States Central Command	27	6	312
United States European Command	2	2	9
United States Northern Command	21	2	320
United States Pacific Command	33	9	1331
United States Southern Command	31	8	961
TOTAL	157	38	3933

CDC, UNICEF, WHO and Institute Pasteur of Cambodia. NAMRU-2 conducted significant entomologic surveys of trapped female mosquitoes from nine districts in the Kampong Speu province, assisted with case investigations and interpreted a serologic survey which led to publication in the September issue of the CDC's *Morbidity and Mortality Report.* As a result, NAMRU-2 is viewed by Cambodian public health officials, from the local level to the ministry level, as subject matter experts for infectious diseases. NAMRU-2 is a trusted resource, particularly when assistance is needed for laboratory testing and epidemiologic support for unknown or unusual pathogens suspected for potential outbreaks.

Capacity building also involves employment and training of local technicians and scientists to support research protocols or specific disease surveillance tasks for GEIS-funded projects. By engaging in capacity building, the DoD helps improve disease control in the host nation, dissemination of public health information for U.S. and coalition force health protection and development of new technologies that can be shared with global partners. In 2012, GEIS funded several projects that were specifically intended to address gaps in general public health systems and provide broad-based, sustainable capacity building solutions for partner countries.

Programs, such as the practical rotations for junior scientists at USAMRU-K, aim to elevate the knowledge and skills of partner country technicians and scientists through a mixture of didactic and on-the-job training. These programs significantly contribute to the development of subject matter expertise in epidemiology, laboratory investigation and outbreak response of personnel within the DoD laboratories and their host country partner organizations. Recipients of these training programs are better able to serve as resources for future academic studies or operational investigations, as well as assisting the local governments' efforts of compliance with IHR (2005). In the USAMRU-K program, university students and recent graduates from civilian and military training programs in the region spend three months rotating through human influenza, sexually transmitted infections and viral hemorrhagic fever laboratories or a medical maintenance shop in Nairobi. After their training, some graduates continue to directly work on GEIS-funded projects such as the Kenyan National Influenza Center or as employees of USAMRU-K. Others have gone on to work for their respective government health system or non-governmental organizations conducting health and wellness programs for their country.

Other GEIS partners are offering similar programs such as the certificate course in emerging infectious disease research at the University of Florida and the advanced epidemiology methods training for partner military officers at NAMRU-6. These programs rely on professional relationships with regional civilian and military health services, academic organizations and the U.S. CCMD to identify qualified applicants and build new partnerships with the trainees. These relationships improve the GEIS network's response to ongoing outbreaks and emerging public health threats. The relationships open the doors for effective coordination, information and sample sharing, technology and knowledge exchanges, and development of sustainable capacities for international health security.

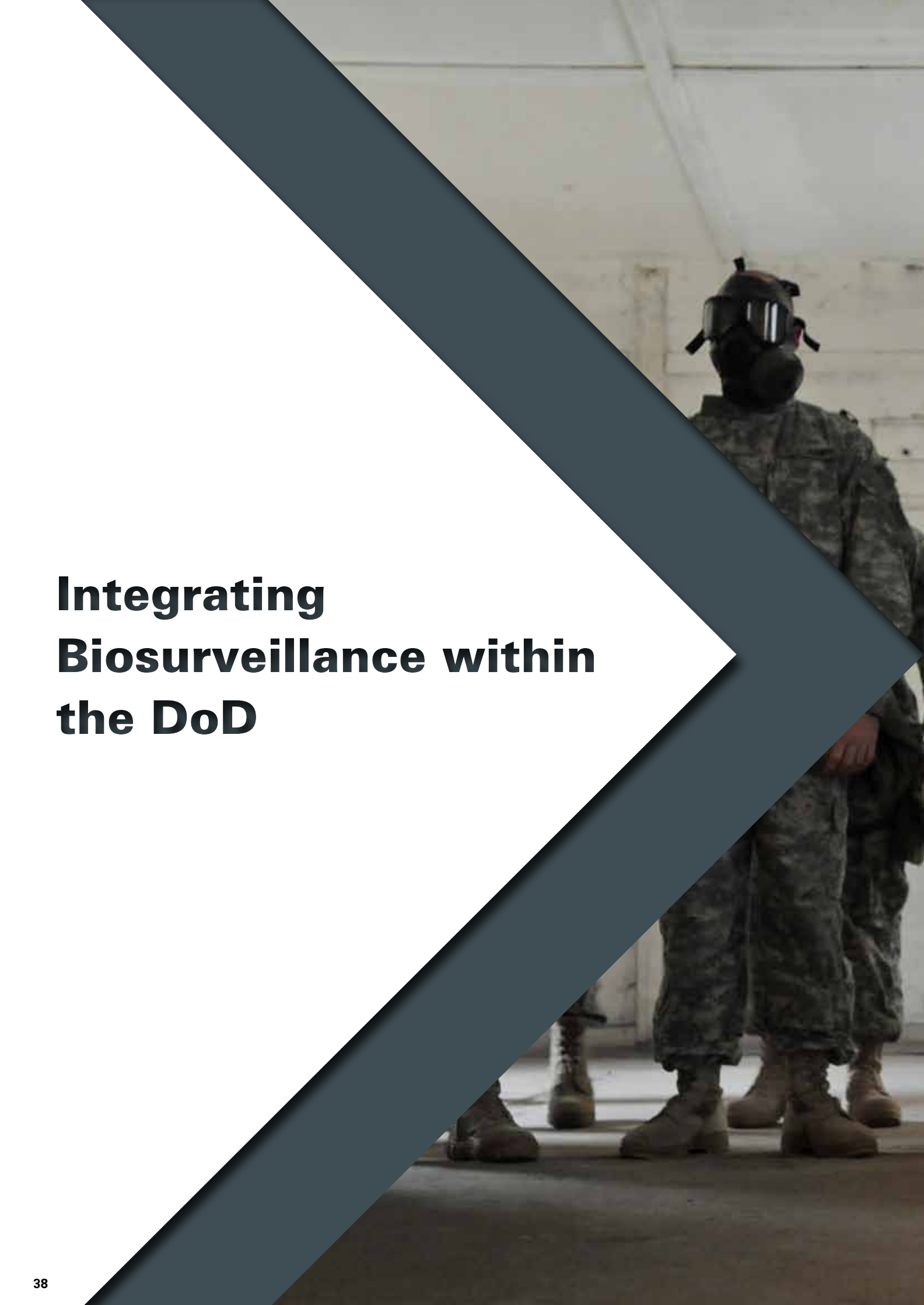
CCMD Coordination and Surveillance Training

The AFHSC funded and co-hosted four global health conferences, workshops and tabletop exercises in partnership with the geographic CCMD. Representatives from countries around the world attended the engagements to improve the ability of partner nations to plan, detect and respond to public health emergencies with particular focus on complying with IHR (2005) and promoting regional cooperation. Participants shared priorities, successes, challenges and lessons learned from past public health emergencies.

AFHSC conducts a semi-annual coordination forum with each CCMD to enhance communication with stakeholders and DoD partners. GEIS partner laboratories are able to discuss their projects and interact directly with CCMD leaders. Furthermore, CCMD leadership convey their priorities to AFHSC and DoD partners, allowing greater comprehension of geopolitical forces and the tailoring of future research efforts. Finally, this forum improves coordination of future AFHSC-CCMD training engagements to make sure the events align with the broader CCMD public health portfolio.


LABCONCO
Visitor

Integrating Biosurveillance within the DoD



Integrated Biosurveillance Division (IB)

As a natural extension of its overall mission, the AFHSC serves a key role in supporting, promoting, improving and coordinating biosurveillance activities within the DoD and across the interagency. To meet this need, AFHSC leadership in coordination with the OASD (HA) created the Integrated Biosurveillance division (IB) in April 2012.

Biosurveillance in the DoD focuses on awareness and understanding of the potential threats from emerging infectious diseases and other hazards (i.e., "all-hazards") relevant to the military. Biosurveillance is conducted in order to promote force health protection, maintain readiness and allow for a relevant and timely response to mitigate the impacts of a given hazard. In 1996, the DoD mission was significantly expanded through the PDD NSTC-7 to include support of global surveillance, training, research and response to emerging infectious disease threats. The White House issued Homeland Security Presidential Directive 21 (HSPD-21) in 2007 that requires stakeholder federal departments to facilitate biosurveillance at all levels of responsibility. This directive explicitly defined biosurveillance as "… [the] process of active data-gathering with appropriate analysis and interpretation of biosphere data that might relate to disease activity and threats to human or animal health." Two years later, the National Security Council (NSC) published the *National Strategy for Countering Biological Threats* with its first objective to "promote global health security," establishing a broad international scope to U.S. government interests in biological health security. For the DoD, the objective laid out by the NSC had clear mission relevance. U.S. military assets work at home and abroad, in garrison and deployed throughout the world, and often with every level and sector of partner nations. The military also has roles and responsibilities under IHR (2005). The U.S. Armed Forces is a major actor on the health security stage by improving relations with partner nations and increasing overall global stability; and in increasing the situational awareness of all levels of government. The DoD has myriad resources already active in this work. A recent and salient national level policy document on biosurveillance is the *National Strategy for Biosurveillance*, signed by President Barack Obama on July 31, 2012. This document urgently calls for a coordinated approach across various levels of government, to achieve a well-integrated, national biosurveillance enterprise. Given this backdrop, it was determined that a robust framework to organize biosurveillance activities within the DoD was required.

Many organizations within DoD have roles, responsibilities and capabilities in medical and public health surveillance of infectious and non-infectious diseases, as well as environmental monitoring of biological threats to military personnel, military-associated demographic groups and foreign populations. DoD components conduct comprehensive, continuous and consistent military health surveillance using technologies, practices and procedures in a manner relatively consistent across the Services. Biosurveillance activities conducted by DoD, and in collaboration with interagency and international partners, directly support the GCCs as force health

protection measures, as a counter to biological threats overall, and in support of other U.S. government policy goals. Biosurveillance efforts have been and continue to be conducted well by various levels of DoD.

The gap, or challenge, is largely related to the coordination and integration of these efforts. In fact, a key outcome of the July 2010 STRATCOM Global Synchronization Conference was an assessment that there are multiple DoD components and U.S. government agencies, allies and non-governmental organizations conducting biosurveillance, but no coordinating body to synchronize these activities, and no mechanism for information sharing and means of rapid indication and warning of an outbreak, biological attack or other hazard. In early 2012, the Joint Staff and its J8 Force Structure, Resources and Assessment Directorate and the Joint Requirements Office for Chemical, Biological, Radiological and Nuclear Defense (JRO-CBRND) developed a process within the DoD known as the Joint "Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Policy" Change Request (JDCR) in order to document and implement *non-materiel* actions to improve the current DoD Biosurveillance (BSV) capability (note that a JDCR for *materiel* requirements is forthcoming). The present JDCR will result in official requirements being set for *non-materiel* needs related to biosurveillance within the DoD. This process has been underway as of February 2012 and is slated to be completed towards the end of fiscal year 2013. The AFHSC, along with the OASD (HA), has been actively participating in this process.

Throughout the above mentioned JDCR process, as well as numerous meetings held within various components of OSD, AFHSC has generally been identified as the appropriate agency within the DoD to fulfill the role of coordinating and addressing the needs of a comprehensive and integrated approach to biosurveillance. AFHSC's IB division has an important mission. Since its creation, the division's priority has been to understand the biosurveillance-related needs of the AFHSC, including its customers and stakeholders, and elucidate the capabilities of other biosurveillance-related organizations within DoD. Going forward, the division's objectives are to:

- Assist the AFHSC in accomplishing its mission of comprehensive health surveillance for the DoD,
- Augment existing DoD biosurveillance capabilities to meet the needs of the Geographic Combatant Commands (GCCs) and other DoD components,
- Reduce fragmentation and synchronize biosurveillance efforts across DoD programs,
- Provide near-real time situational awareness for DoD customers, and

- Provide a resource within DoD to link medical, public health and medical intelligence data.

The division is organized around three teams:

- Alert and Response Operations
- Coordination, Communications and Engagement
- Innovation and Evaluation

The Alert and Response Operations team aims to monitor biosurveillance data sources and professional networks to detect and investigate events relevant to the health of DoD populations; produce timely, relevant information based on the data and information; and provide consultation on issues relevant to the health of DoD populations.

The Coordination and Engagement team aims to engage and coordinate IB activities with other biosurveillance-related activities; coordinate AFHSC's implementation of the Memorandum of Understanding (MOU) Operational Plan (referent MOU was developed and signed between OASD (HA) and the OASD (NCB); and coordinate meetings related to biosurveillance.

The Communications team aims to maintain and provide contact lists for biosurveillance – related issues; exploit diverse electronic media to disseminate and obtain timely, relevant information; and conduct public affairs activities.

The Innovation and Evaluation team aims to assess biosurveillance needs; evaluate and consult on existing and potential biosurveillance systems, data and data sources; and pilot new systems and methods to meet biosurveillance needs.

Since its establishment, IB has staff that includes skill-sets such as infectious disease epidemiology, preventive medicine, family practice medicine, veterinary epidemiology, and bioenvironmental engineering. The division has been admitted to Biological Indications and Warnings Analytic Community (BIWAC) Steering Committee. The mission of the BIWAC is to provide a secure, interagency forum for timely collaborative exchange of critical information regarding indications and warning of biological events that may threaten U.S. national interests.

IB staff have created new methods for investigating disease outbreaks, based on further investigating the novel human coronavirus (MERS-CoV) outbreak and the fungal meningitis outbreak that both occurred in 2012. In the MERS-CoV outbreak, cases to date have only been seen in civilians, but AFHSC worked with the Services to expand retrospective and prospective surveillance to aid in case detection, and helped ensure that GCCs could appropriately send suspect samples to DoD or partner labs for testing. In the fungal meningitis outbreak, AFHSC worked with Tricare Management Activity to rapidly identify four cases in DoD populations.

In addition, the division produced Executive Summaries on seven different disease events affecting DoD and civilian populations, for the situational awareness of DoD leadership across the world. IB staff also has collaborated with HHS, CDC, and the military Services to carry out an assessment of a case of a variant influenza A (H3N2) in a DoD beneficiary, assisting the U.S. government in complying with its obligations under the IHR (2005).

Spreading the News on Medical Surveillance

AFHSC Conferences and Events

CCMD List of Conferences

USAFRICOM

- July 2012 – AFRICOM 2nd meeting of the East Africa Malaria Task Force (Dares Salaam, Tanzania)
- December 2011 – AFRICOM Meeting of the East African Malaria Task Force (Philadelphia, PA)

USNORTHCOM

- June 2012 – One Health: Environmental Health Considerations for Global Emerging Infectious Diseases and Illnesses (Denver, CO)

USSOUTHCOM

- March 2012 – Disease Outbreak Preparedness and Mitigation Workshop (San Salvador, El Salvador)

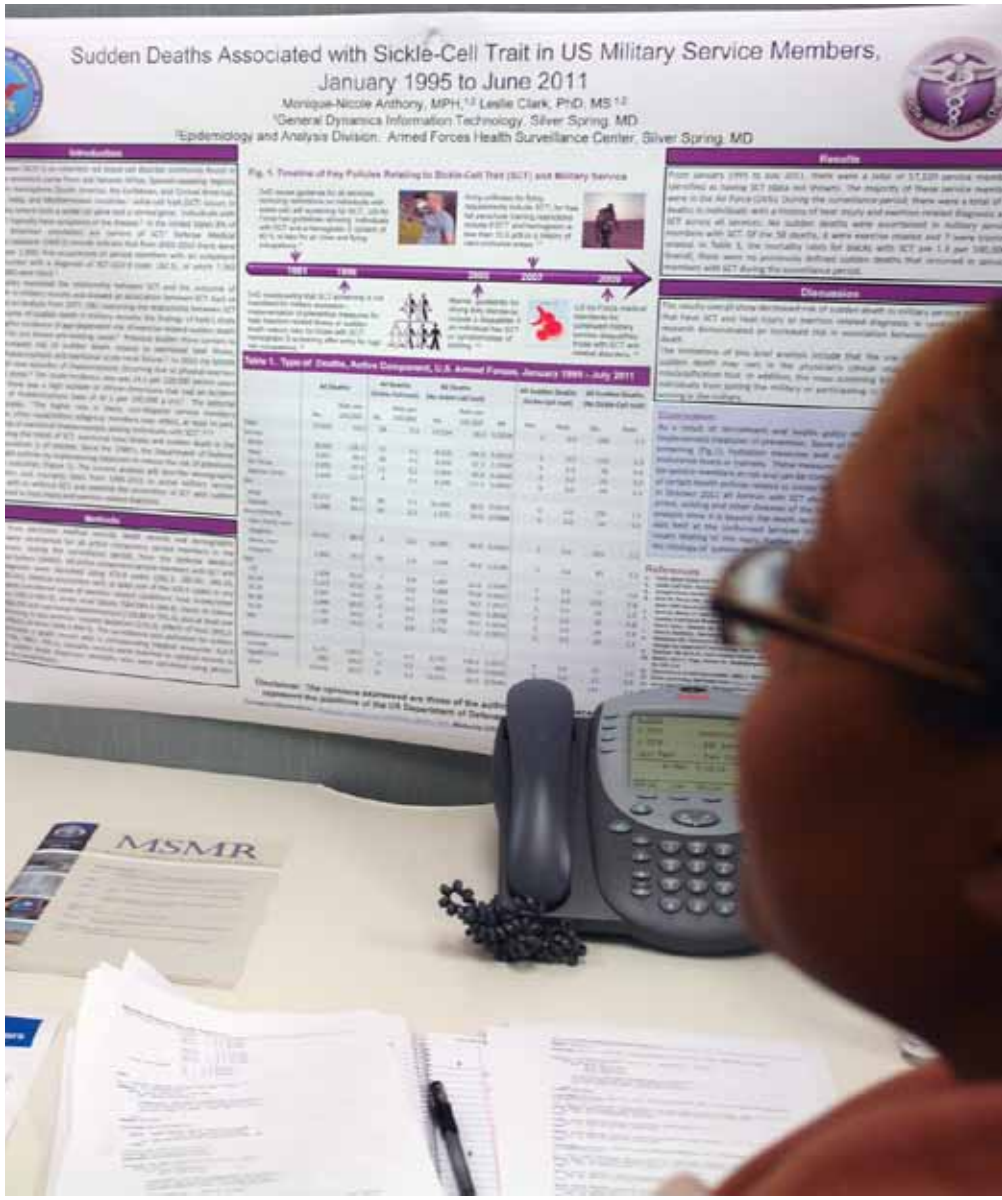
In May of 2012, AFHSC hosted the third in a series of DoD Malaria Stakeholder Meetings to discuss prevention policies and priorities to reduce the impact of malaria on U.S. military forces. Key DoD representatives from the military community, including subject matter experts in infectious diseases, pest management, and regulatory affairs were in attendance, as well as representatives from the CCMDs and Service headquarters. Among the topics addressed throughout the forum included increasing troop compliance with prophylaxis, facilitating the DoD-wide sharing of malaria expertise, improving the diagnosis of malaria cases, and promoting evidence-based use of Primaquine for *Plasmodium vivax* infections. Consensus was reached to utilize the Deployment Health Clinical Center website as the location of a singular, definitive archive of DoD malaria resources, and forum attendees placed emphasis on the development of tech-savvy educational materials geared toward a younger audience. Moving forward, the stakeholders will continue to work toward a harmonized, DoD-wide malaria prophylaxis policy, an evidence-based Primaquine prophylaxis policy, and the actualization of a field-ready rapid diagnostic test.

AFHSC Publications

Publications and presentations are used to communicate important findings and occurrences to peers and policymakers, to archive data and information for future reference, and to teach resident physicians and developing scientists. AFHSC staff and partners are strongly encouraged to submit the results of their work to professional meetings and journals, particularly those that are peer-reviewed, and to use the development of abstracts, oral presentations, posters and manuscripts as teaching vehicles. Each year, AFHSC partners submit proposals for collaboration and these usually provide the background and the basis for the development of internal reports, abstracts and manuscripts.

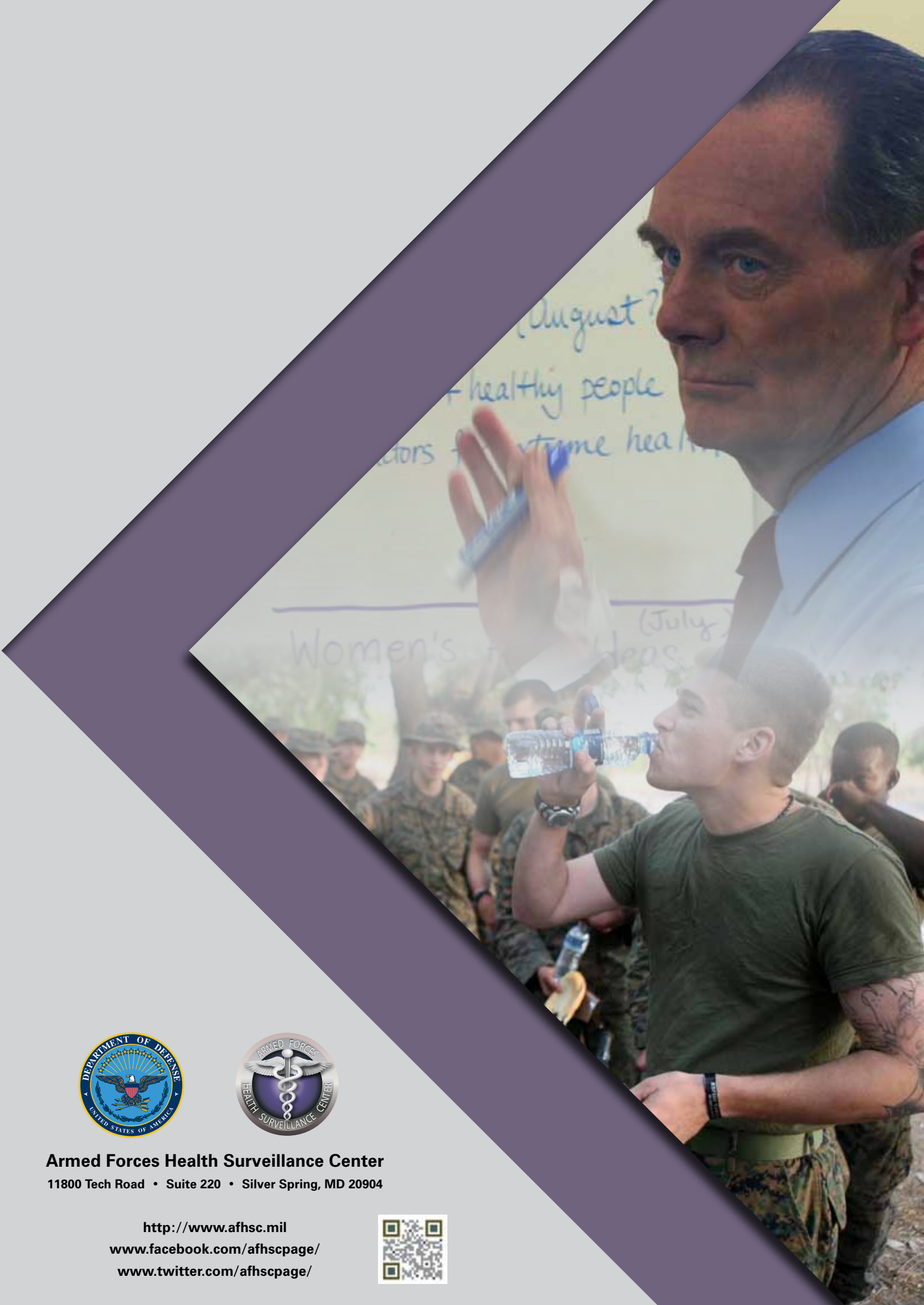
AFHSC reports and publications may be viewed at it website at www.afhsc.mil. In 2012, AFHSC staff and GEIS partners published 59 manuscripts in peer-reviewed journals and prepared 136 posters and presentations for 45 international conferences. These papers and presentations helped in furthering our understanding of the risk regarding disease transmission and severity, as well as disease prevention.

A large number of AFHSC projects and protocol studies are initiated in response to specific questions or needs for data. Many of these are done by junior staff members with supervision by senior managers. The AFHSC director initiated the Director's Abstract & Publication Development & Mentoring Program (DAPDAMP) to ensure that mentoring opportunities are not lost and that worthy



projects and studies are identified for development and submission of abstracts and manuscripts.

A DAPDAMP Working Group convenes regularly to review entries and identify future professional meetings and conferences that may be suitable for presentations by AFHSC staff members. The DAPDAMP provides a structure for the identification and review of AFHSC projects that are suited for mentoring and the development of abstracts and archived reports. Since some work done by the AFHSC staff is of great interest to DoD and other government agencies. AFHSC staff is encouraged to consider submission of selected reports to the Defense Technical Information Center (DTIC), which serves the DoD community as a central resource for scientific and technical information.



Armed Forces Health Surveillance Center

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